

necessary, and does not appear to have been adopted in any of Telford's subsequent designs, which are numerous. Amongst them may be mentioned that of Bonar, Tewkesbury bridge over the Severn, also that over the Dee, near Corwen, &c. Bristol bridge over the Avon, by Jessop, is a neat simple structure. Boston bridge, by Rennie, over the Witham, of 100 feet span, with a versed sine of 4 feet, is remarkable for its boldness and lightness. The principle of construction resembles that of Sunderland, but is an improvement upon it, in having a better system of transverse and diagonal braces, and the spandrels consisting of vertical instead of circular pieces. All these have, however, been far exceeded by the Southwark bridge over the Thames, by Rennie. This consists of three arches, all segments of the same circle; the centre arch is 240 feet span, with a versed sine or rise of 21 feet, and the two side arches are 210 feet span each, with a versed sine or rise of 18 feet 10 inches each. The arches are formed by eight solid ribs in each, and each rib consisting of fifteen pieces, 6 feet deep at the crown of the arch, increasing to 8 feet deep at the springing, 2½ inches thick in the middle, and 4½ at the top and bottom: these ribs are connected together in their transverse direction by cast-iron tie braces of the same depth as the ribs, but open in the centre, and in the diagonal direction by another series of ribs. The whole of the segments, pieces forming the arch, as well as the transverse and diagonal tie braces, are kept in their places by dovetailed sockets and long cast-iron wedges, so that bolts for holding the several pieces together are unnecessary, although they were used during the construction of the bridge to keep the pieces in their places until the wedges had been driven. Thus the ribs formed, as it were, a series of hollow masses or voussoirs similar to those of stone, a principle which, it is believed, is new in the construction of cast-iron bridges, but it has succeeded so well, that it is worthy of adoption elsewhere. The spandrels are composed of cast-iron diagonal pieces, connected together in a similar manner, and the roadway is formed by solid plates of cast iron resting upon the spandrels, and joined together by iron cement. The piers and abutments are of stone, founded upon timber platforms, resting upon bearing piles, and surrounded by sheathing piles, driven sufficiently deep below the bed of the river. The masonry is tied throughout by vertical and horizontal bond stones, so that the whole acts as one mass in the best position to resist the horizontal thrust. The ribs forming the arches were commenced in the centre, and were continued regularly on each side towards the piers and abutments, upon which a cast-iron bed and connecting-plate were laid, nicely let into the masonry to receive the ribs forming the arches. When the last segment of each rib was fixed in its place, three cast-iron wedges, each 9 feet long and 9 inches wide, were placed behind each rib, and nicely adjusted and fitted to them; these having a very slight taper, were driven simultaneously by heavy hammers, and thus the arches were nearly lifted from the centres, so that the wooden wedges upon which the segment pieces rested were easily removed by a few blows of a hammer; the arches were thus relieved from the centres in a very simple and efficient manner. The whole of the ironwork had been so well put together by Messrs. Walker, of Rotherham, the founders, and the masonry by the contractors, Messrs. Jolliffe and Banks, that when the work was finished scarcely any sinking was discernible in the arches. During the progress of the work, some experiments were made, in order to ascertain the extent of the expansion and contraction between the extreme range of winter and summer temperature, and upon taking the average of numerous trials by different gauges, it was found that the crown of the arch rose in the summer about an inch to an inch and a half. The work was commenced in 1813, and the bridge was opened in 1819.

Whilst upon the subject of cast-iron bridges, we must not omit the swivel or turning bridge. The invention, if it may be so termed, is, it is believed, due to England, and one was first made of iron about the year 1810. They are now almost universally adopted over locks, to the extent of fifty feet span, in preference to the old lifting bridge. Since the introduction

of the railway system, cast-iron bridges have become very general, and have been particularly serviceable, being formed of girders, where the height was too limited to admit of the arch principle being adopted. Experience of the value of wrought iron in roofs and for other building purposes has induced R. Stephenson to propose that material for constructing the bridge to carry the Chester and Holyhead Railway across the Menai Straits. His design consists of a close wrought-iron tunnel or tube, 14 feet wide, 30 feet deep, and 1,500 feet long, supported in the middle by a stone pier built upon a rock in the middle of the straits, with two other piers at the low-water mark on either side, leaving four openings, two of them 460 feet, and two of 230 feet each, and 100 feet above high water, so as to admit of masted vessels sailing under it. Cubitt has also proposed to adopt wrought-iron on a great scale, for constructing landing platforms at Liverpool, where the difficulty of building docks or quays, which large steam-vessels can approach at all times of tide, render works of this kind necessary to accommodate the immense traffic frequenting Liverpool. The landing platform designed by Cubitt, and now in course of construction, consists of a wooden frame, 500 feet long by 80 feet wide, floated upon a number of wrought-iron pontoons, each 80 feet long, 10 feet wide, and 6 feet deep; it is connected with the shore by two bridges, each formed of two hollow wrought-iron beams, 150 feet long, carrying the platform of the bridge. The attachment with the shore and the stage is so made as to admit of motion, both vertically and horizontally, to accommodate itself to the rising, falling, ebbing, and flowing of the tide, which there rises about thirty feet.

VALUE OF LAND.

THE following proposals, recently submitted to the Court of Aldermen, for the sale of not less than five acres of freehold ground for the site of the proposed House of Correction, in reply to an advertisement, serve to shew the value put upon land in two or three localities:—

Nine acres at Tuffnell-park, Holloway, the same being leasehold, 416 years unexpired, at 5,000 guineas, or for any portion thereof, not less than three acres, at 700 guineas per acre.

Thirteen acres of grass land at Holloway, near Hornsey-lane, being copyhold, at 7,000*l.*, leaving the purchaser to enfranchise the same, if he desires so to do, at an expense of about 3,600*l.*—total, 10,600*l.*

Eleven or twelve acres of freehold ground in Tollington-lane, Upper Highbury, at 1,000*l.* per acre.

Fourteen acres, two roads, twenty-two perches of freehold ground, part of the late Lord Thurlow's property, on the road from Cumberwell-green to Norwood, at 400*l.* per acre; the land-tax redeemed.

6½ acres of freehold ground at Central-hill, Norwood, for the sum of 2,000*l.* This is near the Annerly station on the Croydon Railway.

PENALTIES TO SECURE PUNCTUALITY IN THE EXECUTION OF BUILDING CONTRACTS.

PENALTIES for delay in the execution of contracts are, it is well known, with rare exceptions, mere moonshine. The following plan has been acted on recently in some important transactions. The tender, for instance, is to complete the works, by a given day, for 10,000*l.* The contract signed is to pay 8,000*l.* at all events, but to pay 10,000*l.* if the works are completed by the given day. If they are completed by that day, according to the tender, the 10,000*l.* must be paid; but if that day passes without their completion, the contractor has no remedy except for the 8,000*l.* The legal difficulties attending the enforcement of penalties are thus avoided.

THE WHITTINGTON CLUB, founded to give increased facilities for moral and intellectual education, and for refined social intercourse, to classes hitherto debarred from their enjoyment, held their first *soirée*, on Wednesday evening, at the City of London Tavern. Douglas Jerrold took the chair, and an immense crowd enjoyed a pleasant evening.

Correspondence.

STATE OF THE ROADS IN NEW QUARTERS.

SIR,—The sanitary state of the metropolis has so often engaged your attention, and is a matter in which the public are so much interested, that perhaps no apology is necessary in troubling you with a few remarks the subject has suggested. I propose to allude to the very unwholesome state of some of the streets and thoroughfares in the remoter parts of the town. In many instances the houses have been finished and inhabited for years, while the carriage-way remains in an impassable state, with deep ruts and pools of green and stagnant water standing in all directions.

Of course, during the greater part of the year nothing can pass off these streets: there they remain the receptacle of decaying vegetables and other abominations exhalant a damp and pestilential air. And where, as in some instances, the sewers have been made, how can the superfluous water ever reach the gratings, or heavy falls of rain scour the road, and put it into a healthy state?

In Liverpool and elsewhere, I believe, it has been proved, that by paving or otherwise making hard and compact the surface of certain courts and lanes, which had always been the abodes of fever and ague, in their former state, such places have been rendered healthy, becoming anon dry, after the heaviest rains scouring off all impurities. How far disease is prevalent in the localities I have alluded to, I am not competent to assert; but to a casual observer the abodes on the borders of such bogs and quagmires must be any thing than healthy, and, in a moral point of view, any thing than conducive to cleanliness and comfort. If the abodes of our middling and lower classes should be made as clean and respectable as circumstances may admit of, it is very important that the approaches to such abodes should be passable, hard, and easy of access,—easier by any carriage heavier than a wheelbarrow, which such streets are not at present, except on the footpaths.

That the facts are not overrated, any inhabitant of Pentonville, Bethnal Green, &c., I think, would affirm; and in the hope that these few remarks may tend to some improvement, your insertion of them will much oblige, yours, &c.,
A SUBSCRIBER.

Islington, 16 Feb. 1847.

EXPENSE OF PRIVATE BILLS. SEWERS, &c., FOR VENTNOR.

SIR,—Seeing in a recent number of THE BUILDER your remarks on the great expense of obtaining private bills, I would state as an instance, that through a fortuitous opposition, the expenses in obtaining an Act for sewerage, lighting, and improving this place, were *two-fifths* of the amount of money empowered to be raised for these purposes, and from this circumstance they cannot be carried out but very partially. It is time some change was made.—I am, Sir, &c.,
T. P.
Ventnor, Isle of Wight, Feb. 13th, 1847.

PROPOSED GREAT PUBLIC BUILDING AT SHEFFIELD.—Plans have been prepared by Messrs. Flockton, Lee, and Flockton, architects, of "a most extensive edifice, which would be distinguished as the building of the borough," and which appears to be at present under consideration of the council. The *Iris* and the *Times* call it a "mansion-house and public buildings," or a "council-hall." It is proposed to erect it as a detached edifice, on a very central site, comprising a large area between Bank-street and Harthead. The purposes to which it is proposed to devote it are manifold, comprehending, in fact, "all public purposes;" but it is chiefly to consist of a hall, with standing room for 10,000 people, a council-hall, &c., a court of bankruptcy, stock-exchange, school of design, museum of arts, mechanics' institute and atheneum, literary and philosophical, and various other societies' rooms, banqueting-rooms, and numerous other rooms for public institutions. Other towns must look out.

FRUITS OF CANDIDISM.—According to a local paper, the architect employed to build the Protestant Church at Leeds, to which Mr. Haigh was to give ten thousand pounds, has followed the example of Mr. Haigh, and been received into the Roman Catholic Church.